

Claims

1. Method for coating a piston ring (10) for internal combustion engines, consisting of steel or cast iron, in which at least the working surface (07) of the piston ring is provided with an anti-abrasion or anti-corrosion coating (12) by means of a coating process,

characterized by the characteristics:

- a) Adjusting the coating parameters;
- b) Applying a pre-stress to an uncoated piston ring (10), to a predetermined piston ring diameter (06) or total free gap (01);
- c) Carrying out the ion coating process using the coating parameters according to step a);
- d) Measuring the inherent coating stress of the anti-abrasion or anti-corrosion coating (12) in status b);
- e) Applying a tensile pre-stress or pressure pre-stress to a new, uncoated piston ring 10, as a function of the measured inherent coating stress; and
- f) Coating the piston ring (10) by means of the coating parameters according to step a).

2. Method according to claim 1, **characterized in that** in the case of an inherent pressure stress of the anti-abrasion or anti-corrosion coating, the piston ring (10) has a pressure pre-stress applied to it at the ring circumference during process step f), and in the case of an inherent tensile stress of the anti-abrasion and anti-corrosion coating (12), the piston ring (10) has a tensile pre-stress applied to it at the circumference.
3. Method according to claim 2, **characterized in that** the inherent coating stress of the anti-abrasion and anti-corrosion coating (12) has a value of (minus) -200 to (minus) -800 N/mm², after being coated, in the installed state of the piston ring (10) in the cylinder of an engine.
4. Method according to claim 1 and 2, **characterized in that** application of the tensile or pressure pre-stress to the piston ring (10) takes place over the entire duration of the coating process.
5. Method according to claim 1, **characterized in that** the measurement of the inherent coating stress is performed,

after the coating process has taken place, by means of X-ray diffraction.

6. Method according to claim 5, **characterized in that** the X-ray diffraction measurement takes place opposite the ring joint (02).
7. Method according to claim 1, **characterized in that** the anti-abrasion or anti-corrosion coating is formed from a CrN or Cr₂N or TiN or TiC anti-abrasion or anti-corrosion coating (12).
8. Method according to claim 1, **characterized in that** the coating process is a PVD process.
9. Method according to claim 1, **characterized in that** the coating process is a galvanic process.